Canada. Statistics Canada
Finding and Using Statitics - a basic guide from Statistics Canada

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Également disponible en français sous le titre
Comment obtenir et utiliser les statistiques

There is a $1.00 handling fee for this publication

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Introduction

Statistics Canada produces a large volume and variety of statistics which are available to all Canadians. The information is used extensively by highly trained statisticians, economists and social scientists; but they are not the only people who can benefit from this valuable national resource. The vast majority of the data can be obtained easily and at reasonable cost and, with very little expertise, they can become an important information source for people in all walks of life – education, the media, business and labour organizations – and those involved in social and community programs. They can also help raise the general public's level of awareness and understanding of the economic and social structure and functioning of our country.

For some subject areas, there are important sources of statistical data other than Statistics Canada. However, Statistics Canada is the primary source for data on most subjects and, where there are other possible sources of data, Statistics Canada's Advisors (see list page 57) can usually direct users to the appropriate publications.

The purpose of this handbook is to offer the inexperienced user of statistics some guidance on how statistics may be able to help, and to provide them with some basic skills so they can find and use the information they require.

A Few Words About Statistics Canada

Statistics Canada is our country's national statistical agency and, as such, is responsible for collecting and publishing data on almost every type of social and economic activity in Canada. To meet this responsibility it has developed a very broad publishing program which not only takes account of what information is wanted, but also endeavours to provide that information in the most appropriate format. This involves innumerable conventional-style publications, computer tapes and printouts, on-line computer access, microfilm and microfiche, plus a number of back-up services to help make the information as useful as possible.

Statistics Canada's operations are governed by the Statistics Act which identifies certain specific areas in which the agency must collect and publish data – for example, it has to carry out Censuses of Population and Agriculture at fixed intervals – but beyond this it simply charges the agency with the responsibility to:

"collect, compile, analyse, abstract and publish statistical information relating to the commercial, industrial, financial, social, economic and general activities and conditions of the people".

Because it has such a broad mandate, Statistics Canada, in consultation with data users and providers, has to decide what it will collect and publish. The past 15 years or so have seen an enormous increase in the demand for detailed, up-to-date statistical information coming from all sectors – government, business, institutions, private individuals. Statistics Canada has endeavoured to meet as much of the demand as possible but this has become increasingly difficult in recent years. In addition to concerns about privacy and paperburden which have had a restraining effect on new collection initiatives, budgetary constraints have led to an increasing pressure to maximize the usefulness of the existing system and to encourage Canadians to make greater use of it.

Prior to 1971 Statistics Canada was called the Dominion Bureau of Statistics, and the term "bureau" is still used to refer to the agency today. The bureau is divided into about 40 divisions each of which is responsible for a particular activity in the collection, processing or dissemination of statistics. These divisions are grouped together into a small number of fields and the fields report to the Chief Statistician of Canada who is in charge of the full range of activities of the bureau.

Many of these divisions have as their function the regular production of a particular set of data. Some examples are the Construction Division which is responsible for construction data, the Prices Division for data on various kinds of prices, and the Health Division which produces health statistics. This is why there will often be a particular "subject-matter division" identified as the originating source of published data from Statistics Canada.

Other divisions within the bureau are occupied with functions such as the provision of data processing services or the dissemination of data, including responding to requests for assistance from data users. The division with the unique and specific function of aiding data users is the User Advisory Services Division (refer to page 52).

The Variety and Detail of Statistics

It is impossible for a handbook such as this to detail the thousands of subjects on which Statistics Canada produces data. However, it is very important that users have some appreciation of the scope and depth of the information available.

There are some statistical series produced by Statistics Canada which are very well known and which make news, even headlines, each time they are published. For example, there is the *Consumer Price Index* which is regarded by many as the key measure of inflation; and the *Labour Force Survey* which provides the unemployment figures every month. There is also the *Census of Population* which is taken every five years. More people are aware of the information gathering process (since everyone is involved at one time or another) than the information generated, but this latter is potentially of interest and use to everyone.

To give some idea of the topics covered by Statistics Canada publications, the Table of Contents from the *1980 Statistics Canada Catalogue* is given on pages 5 to 8. This shows the various subject groups (major groups and sub-groups) for which the bureau publishes data. Even when one realizes the total number of bureau publications (there are about eight published every working day), it is still difficult to appreciate the number of topics covered and the detail available.

To give an example of the detail, most people know about the Consumer Price Index but few realize there are indexes published for components of the CPI, such as food, housing, clothing, transportation and others. Similarly, people who are aware that Statistics Canada publishes figures on the balance of Canada's trade do not always realize there are monthly data on the volume and value of exports and imports of individual commodities to and from individual countries. The individual reports published each year on the various sectors of the manufacturing industry each include such principal statistics as number of establishments, number and type of employees, wages and salaries, cost of fuel and electricity, value of shipments, and value added (plus comparative statistics for Canada for earlier years and for provinces for the preceding year). This is in addition to more frequent publications on shipments, production or consumption of certain commodities and monthly figures on shipments, inventories and orders for manufacturing industries in total, numerous sub-aggregations, and selected industries.

Other statistics are designed to present a broader economic perspective. For example, every quarter Statistics Canada produces the *National Income and Expenditure Accounts* for the country as a whole. These give a measure of the economy's overall performance showing such things as government revenue and expenditure, gross national expenditure, sources and disposition of personal income, national income and gross national product.

Statistics Canada makes a general distinction between statistics which are primarily used in economic studies and statistics used in studies of social phenomena. For example, the dollar value of output in the automobile industry would be regarded as an economic statistic. The number of people of Italian descent in the Toronto region would be regarded as a social statistic.

Social statistics often focus on characteristics such as age, sex, marital status, language, ethnicity, income, educational attainment, and so forth. They include subjects as diverse as the incidence of illness or the frequency of crimes in an area.

1980 STATISTICS CANADA CATALOGUE – Table of Contents

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Sources of Data

Statistics are collected from many different sources and in many different ways. Understanding something of the source or sources of data will give users a better basis for interpretation and analysis.

Published data from Statistics Canada are generally produced from surveys but can also include data produced as a by-product of administrative activities. For example, import and export data are obtained from customs forms, business financial data from corporate financial statements, justice statistics from court records, and health statistics from hospital records – to name only a few.

Where surveys are used as the source of statistical data they may be either sample surveys or censuses. Sample surveys use the responses of a few to draw conclusions about the complete group or population. Census surveys are surveys in which every possible respondent is approached. The five- and ten-year Censuses of Population and Housing are the most well known of the surveys using full census coverage.

In general the source of data cannot be identified with certainty from the statistical tabulations themselves. Statistics Canada publications usually give some description of the source of the data in a separate part of the text.

The two most important sources of survey data are private households and business establishments.

When a survey is designed so that the statistical data are obtained by contacting private households, it is termed a household type survey. In a household survey, such as the quinquennial Census of Population or the Labour Force Survey, one person in the household is usually asked questions about each individual within the household, about their family relationships, and about the dwelling in which they live. Thus the one reporting unit can serve as the source for statistics on individuals, families, dwellings and other statistical units.

When a survey is designed so that statistical information is gathered by contacting officials in business establishments, it is termed an establishment survey. Establishment surveys provide most of the data on economic production, consumption, costs, and many other factors important in measuring economic activity.

Users of statistical data need not necessarily think in terms of any specific survey or type of survey when seeking data on a particular subject. They will be able to identify a general subject area for which they need data and they may also know the particular statistical units and variables needed. After having found the data they need by looking through the *Statistics Canada Catalogue* for the general subject area or for the particular statistical units of interest, users may then be interested in the sources of the data and the methodology used in com-

piling them. This information can give greater depth to the interpretation and analysis of the figures. Information on sources and methodology is usually given in the Explanatory Notes included in the publication and, if required, a more detailed explanation is available from the statisticians responsible for the data.

Section I

Finding the Data

FINDING THE DATA

Statistics Canada publishes data in a variety of ways and finding the information which is wanted, in the most useful format, can pose a problem for both experienced and inexperienced users. The following is a brief explanation of the different ways in which data are made available and the tools which are provided to help users identify and acquire the information they want.

This section is intended to assist users who wish to research information on their own. But the golden rule is: if in doubt – ask. The section beginning on page 49 gives further information on Statistics Canada user services and readers who need more help are urged to make use of them.

When users embark on a search for statistics to assist in a particular study, it will simplify their task if they can identify a basic unit and the particular variables which they wish to take into consideration. Statistics Canada reference centre staff are able to offer assistance in this. For example, a researcher might be interested in the unemployed, in which case the basic unit being considered would be the unemployed person. However, researchers using data on unemployed persons might like to investigate particular features, or variables, of the unemployed population, such as age, sex or educational attainment. So these researchers would seek statistics on the unemployed population cross-classified in statistical tables by whatever particular variables they expect to be relevant to an analysis of unemployment.

Generally, researchers can identify some sort of basic unit in which they are interested and some particular variables which they would like to investigate. Demographers might want to consider persons in terms of ethnicity or level of income. Criminologists might consider incidence of crime by geographic area or medical researchers might want to study cancer patients classified by their ages.

Statistical units and the variables by which they are cross-classified are established by Statistics Canada according to the needs of many different users. The variety of statistical units counted and the variables by which they are classified are limited by the costs of collecting data, the need to avoid overburdening the public with questionnaires, the need to guard against disclosure of confidential information, and by other factors. More is said on the subject of standards and classifications of statistical data on page 33.

Printed Publications

Despite developments over the past few years in the dissemination of data via computers, the primary means of publishing statistics is still conventional hard copy, i.e., books and bulletins containing tables of figures.

The Catalogue

We have already mentioned the *Statistics Canada Catalogue.* This book, which is available in either English or French, is the basic tool for identifying the most appropriate data source from among the hundreds of publications. The catalogue is available from:

User Advisory Services,
Statistics Canada,
Ottawa, Ontario.
K1A 0T6

or from any regional reference centre of Statistics Canada (see page 57). Single copies are available free of charge.

At the time of this handbook going to print, the 1980 Catalogue is the most current available. Prior to 1980 there were nine issues of the Catalogue going back to 1960 and more before that.

The 1980 Catalogue is in two sections. The first section is an annotated list of publications which have catalogue numbers. This gives details of the frequency of publication, the language or languages in which it is issued,[1] the number of pages, the International Standard Serial Number where it is assigned, the reference date of the first issue, the price, and a brief description of the contents.

The second section is a detailed subject/title index, arranged in alphabetical order and cross-referenced to show all the publications in which information on a particular subject might be found.

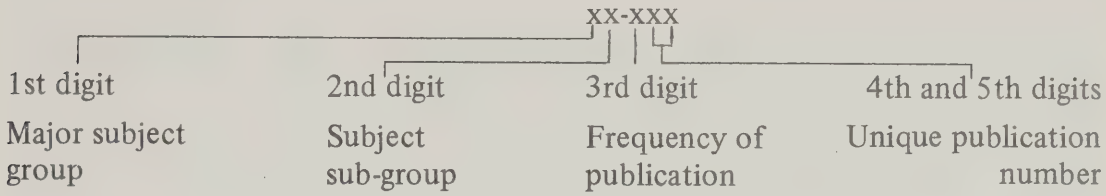
Prior to the 1978 - 79 issue of the Catalogue, census terms were presented in a separate section of the index. The 1978 - 79 and the 1980 Catalogues have integrated census and non-census terms completely.

The index of the 1980 Catalogue lists over 10,000 subject references and includes cross-references based on the Library of Congress subject headings, all up-dated to January 1, 1980.

[1] Most commonly, Statistics Canada publications are in bilingual format, with English and French side by side. In some special cases, there are separate English and French editions.

Catalogue Numbers

Nearly all Statistics Canada publications are given a unique five-digit catalogue number which, with the title, provides easy identification. These numbers are formulated as follows:



First digit.[2] All publications are classified into one of the following eight major subject groups:

1 – General
2 – Primary Industries
3 and 4 – Manufacturing
5 – Transportation, Communications and Utilities
6 – Commerce, Construction, Finance and Prices
7 – Employment, Unemployment and Labour Income
8 – Education, Culture, Health and Welfare
9 – Census.

Second digit.[2] Each major group is further divided into a number of sub-groups. For example, Major Group 6: Commerce, Construction, Finance and Prices is divided into sub-groups:

1 – Business Conditions
2 – Prices and Consumer Expenditure
3 – Merchandising and Services
4 – Construction and Housing
5 – External Trade
6 – International Travel
7 – Balance of Payments and International Investments
8 – Government Finance.

Third digit. This indicates the frequency of publication.

0 – Issued more often than once a year
2 – Issued annually
4 – Issued biennially
5 – Issued once only or on an occasional basis
6 – Issued annually with various sub-titles

[2] The major and sub-group numbers are given in the Catalogue's Table of Contents – see page 5.

7 – 1971 Census
8 – 1976 Census.

A change in the frequency of a publication will automatically result in a change in the third digit of its catalogue number.

Fourth and fifth digits. These are issued sequentially to each publication in each sub-group and ensure that every publication has its own unique permanent number.

Suffix "E" or "F". These are given to the few publications for which separate English and French editions are issued.

The following example is typical of how the catalogue numbering system works: The publication *International Air Charter Statistics* was assigned cat. no. 51-003 as follows:

5 – Major group: Transportation, Communications and Utilities
1 – Sub-group: Air Transportation
0 – Frequency: More than once a year – in this case quarterly
03 – Third publication in this sub-group given a catalogue number

In addition to Statistics Canada's own catalogue numbering system, the National Library of Canada assigns eight-digit International Standard Serial Numbers to the serial publications of federal government departments. These numbers facilitate identification, citation, ordering and bibliographic control on an international basis. As these numbers are issued, they are included in the *Statistics Canada Catalogue.*

The Historical Catalogue, 1918 - 60

Because the regular catalogue cannot contain all the publications ever issued by Statistics Canada, an *Historical Catalogue* containing the titles of all publications from 1918 to 1960 is also available. It has a title index and a list of all census publications from 1871 to 1951.

The 1971, 1972 and 1973 - 74 Catalogues included all changes since 1960. In the catalogues released since 1974, it has not been possible to list the changes in publications back to 1960.

To reference all publications it is now necessary to use the *Historical Catalogue* (for pre-1960); the 1973 - 74 Catalogue (for the period 1960 - 74) and all subsequant editions of the Catalogue; plus the 1968 Catalogue which contains the 1956 quinquennial census.

Publication Format

In recent years, there has been an effort to standardize the format of Statistics Canada publications. As well as having obvious financial advantages, this has proved useful to regular users who are familiar with the publications. As a general

rule, publications contain an introduction or description of the data, a table of contents and numerous statistical tables. With only a few exceptions, the covers are a standard design with the catalogue number in the top left-hand corner and the title underneath. The colour of the cover provides an additional quick guide to the subject matter of the contents.

Compendia

Most of the publications issued by Statistics Canada concentrate on one subject, for example "Electric Power Statistics"; or on a group of related subjects, for example, "Employment, Earnings and Hours". However, there are a few publications which cover a broad range of topics:

The *Canadian Statistical Review* (cat. nos. 11-003E and 11-003F), published monthly, summarizes the major current economic indicators. It contains over 100 pages of basic statistics and includes a special section on seasonally adjusted major indicators and charts. It also features articles on general economic conditions and special subjects. Subscribers receive weekly, annual and historical supplements as issued.

Perspective Canada II (cat. nos. 11-508E and 11-508F) contains over 200 tables, 145 charts and a brief text on such basic social issues as health, education, work and cultural diversity. It describes some of the fundamental social concerns, reviews some of the statistical measurement problems involved in investigating these concerns and suggests sources for further information on each subject.

The *Canada Year Book* (cat. nos. 11-402E and 11-402F) is issued biennially as an authoritative reference work on Canada's physical and natural resources, social and economic conditions, governments, industry, finances and legal system. A biennial handbook entitled *Canada Handbook* (cat. nos. 11-403E and 11-403F) provides information on the present conditions and recent developments in Canada. It describes the country's physical environment, the people and their heritage, the economy and government structure and services. These two publications, which will be released in alternate years, are mostly textual, but contain a large number of facts and figures. They fill the need of many Canadians for a general reference book on their country.

The *Market Research Handbook* (cat. no. 63-224) provides a convenient source of information and reference for those engaged in analysing Canadian markets. The data cover such topics as general economic indicators, population characteristics, personal income and expenditure, household facilities and merchandising and services.

Keeping Up-to-date

When searching for data it is often necessary to be sure that the information acquired is the latest available. The *Statistics Canada Catalogue* is published as frequently as possible but, to be completely up-to-date, it is important to be aware of the latest releases and whether or not previously published figures have been revised.

The *Statistics Canada Daily* (cat. nos. 11-001E and 11-001F) is published every business day and contains summary information of statistical findings, announcements of reports, reference papers and other releases, plus a list of the publications released that day. It is designed for people who need to be informed of day-to-day developments in available information.

Informat (cat. nos. 11-002E and 11-002F) is a weekly digest highlighting major Statistics Canada reports, reference papers and other releases. It contains charts, summaries of the latest monthly statistics and a complete list of publications released during the week.

A quarterly publication entitled *New Surveys* (cat. no. 11-006) reports new surveys and major revisions to existing surveys being carried out by Statistics Canada and other federal government departments.

Finally, for people who want to know about Statistics Canada programs there is the *Statistics Canada Annual Report* (cat. no. 11-201) which provides information on bureau activities, plus a detailed review of the work of each division in the previous fiscal year.

Changes in Publications

The *1980 Statistics Canada Catalogue* provides a list of **new publications** issued since the previous Catalogue (either as the first in a series or as a single issue publication) and a list of **discontinued publications** giving the date of the final issue.

It also includes a list of **title and other changes** since the previous (1978 - 79) Catalogue including, for example, changes in the frequency of publications. The exact nature of the change is specified in each case along with the issue in which the change is first implemented.

How to Order Publications

Individual publications or subscriptions may be ordered from reference centres across Canada (see list page 57) or from:

Publications Distribution,
Statistics Canada,
Ottawa, Ontario.
K1A 0T6
Telephone: (613) 992-3151

Orders should quote catalogue numbers, titles and issues (month, year) required. Payment should be in the form of cheque or money order made payable to the Receiver General for Canada or customers may use any of a variety of charge accounts. Subscription orders are accepted for all serial publications but not for biennial or occasional publications.

Alternatively, individual publications can be ordered through many bookstores throughout the country and especially Government of Canada "authorized agent" bookstores. These agents are usually listed in the telephone book yellow pages under "Book Dealers – Retail – Government of Canada Publications". Those interested in obtaining all Statistics Canada publications can order the Full Publication Service and receive publications automatically as soon as they are released. The Full Publication Service does not include publications from the decennial or quinquennial Censuses of Population and Housing or from the Censuses of Agriculture, Retail Trade, Wholesale Trade or Service Trade.

Library Access to Statistics Canada Publications

People who want to consult Statistics Canada publications may do so at any regional reference centre (see list page 57), at the Statistics Canada Library in the R.H. Coats Building in Ottawa, or at any of the more than 60 libraries across the country which carry all Statistics Canada publications. Over 45 of these are Full Depository Libraries (FDL's) which automatically receive all federal government publications free of charge. They include most provincial legislative libraries, and many university and public libraries. Apart from the FDL's there are some libraries which receive all Statistics Canada publications and make them available for reference. A list of FDL's and other libraries which carry all Statistics Canada publications is given on page 55. In addition to these, most public libraries hold some of the bureau's publications. Some have large collections, particularly of census data, while others carry only a small selection of the more general publications.

Data Available Via Computer – CANSIM®(Canadian Socio-Economic Information Management System)

CANSIM is Statistics Canada's computerized database containing information available to the general public. The data available via CANSIM are of two types – time series data which show changes over a period of time and cross-classified data which show the relationships between different phenomena at a given point in time.

The following is a brief explanation of the types of data available from CANSIM and some of the manuals and other services provided to assist users. Further information is available from the CANSIM staff or from User Advisory Services. All the regional reference centres of Statistics Canada have terminals which can be used to access CANSIM for a fee.

Time Series Data

CANSIM currently contains some 300,000 time series and this number is constantly growing. The series are updated daily, usually at the same time as the data are officially released in the *Statistics Canada Daily*. It includes both current and historical information on a broad range of socio-economic subjects:

System of National Accounts
Prices and Price Indexes
Labour
Manufacturing and Primary Industries (including Fuel, Power and Mining)
Capital and Finance
Construction
Merchandising and Services
External Trade
Transportation
Agriculture and Food
Population Estimates and Projections
Health and Welfare.

It also contains data from numerous tables in the *Canadian Statistical Review*, the *Bank of Canada Review* (including selected United States statistics) the *Alberta Statistical Review*, and the *Quebec Statistical Review*.

The *CANSIM Summary Reference Index* (cat. nos. 12-202E and 12-202F) summarizes the contents by subject and source publication. It also provides the identification numbers which form the key to the *CANSIM Main Base Series*

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Directory (cat. nos. 12-203E and 12-203F). The Directory is a detailed guide to all the time series data on CANSIM.

The **CANSIM Main Base** contains all the time series data on CANSIM. Is is maintained at a commercial computer service bureau and data can be retrieved by typewriter terminal, using either an interactive or batch system. A card reader-printer can also be used for batch retrieval. Toll free lines are available for low speed terminal access from major Canadian cities. The CANSIM Interactive System (CIS) provides terminal access to the CANSIM Main Base and is designed for use by people who do not have detailed knowledge of computer programming. Procedures for accessing and retrieving data via CIS are set out in the *CANSIM Interactive System Users Manual* (cat. nos. 12-553E and 12-553F). The batch system is a more economical method of data retrieval and is appropriate for users handling large volumes of data. Data manipulation programs for the advanced user (e.g., regression, modelling and forecasting techniques) are available at the commercial service bureau. The procedures for accessing and retrieving data in batch form, or using a card reader-printer, are set out in *The CANSIM Users Manual for Data Retrieval and Manipulation* (cat. nos. 12-531E and 12-531F).

From the CANSIM Main Base, Statistics Canada has developed a **CANSIM Mini Base** which includes only the most widely used time series (currently some 25,000 series).

The Mini Base is available from a number of secondary distributors, i.e., commercial organizations which distribute CANSIM data according to Statistics Canada guidelines. These distributors offer a variety of software packages and support services. The data on the Mini Base are updated daily, within one working day of their being updated on the Main Base. The *CANSIM Mini Base Series Directory* (cat. nos. 12-204E and 12-204F), provides the title, start date, source, etc., for each series on the Mini Base.

Cross-classified Data

Cross-classified social statistics are now available through CANSIM. This system is designed to meet the needs of analysts and researchers interested in the interrelationships between a number of social conditions. The data are generally drawn from the fields of health and welfare, justice, education, culture, Census of Population, etc. The cross-classified section of CANSIM is currently available only through the service bureau which houses the CANSIM Main Base.

At the present time, CANSIM is housed at Datacrown Inc. Further information, including lists of secondary distributors, may be obtained from:

CANSIM,
Statistics Canada,
Ottawa, Ontario,
K1A 0Z8

or from any of the Statistics Canada reference centres across the country (see list page 57).

Microfilm and Microfiche

In addition to publications and computer based data, Statistics Canada makes available large blocks of data on microfilm or microfiche. For example, a large part of the output of the 1976 Census of Population and Housing is available on microfiche (see page 8), as are almost all 1976 Census of Agriculture tabulations and all current serial publications of the External Trade Division. Further details can be obtained from Statistics Canada regional reference centres.

The complete historical collection of Statistics Canada publications up to and including 1975, with a few exceptions, has been reproduced on microfiche under arrangement with Micromedia Limited of Toronto. This brings together the most comprehensive body of Canadian statistical material ever assembled. Many rare and out-of-print items are included. For further information on this project please contact:

Micromedia Limited,
5th Floor,
144 Front Street West,
Toronto, Ontario.
M5J 1G2
Telephone: (416) 593-4211

Information Available On Special Request (With Particular Reference to the Census of Population and Housing)

Although many of the data produced by Statistics Canada are published in books or made available on CANSIM or in microform there is still a vast amount of data which are available to users but are not formally published because the interest in them is not sufficiently broad. These data may be available to users who request them in the form of special tabulations, on computer printouts or copies of special statements, etc. They can also be available in the form of data files – punch card decks, summary tapes or microdata files (i.e., individual survey records which have been stripped of any information which might identify the individual, family, household, etc.) or they may be in the form of information such as maps and technical papers. All this information comes under the general heading of "Unpublished Data" (although they are "unpublished", the data are still subject to the confidentiality restrictions which apply to all information made available by Statistics Canada).

The following summary of the unpublished information available from the Census of Population and Housing is included here for two reasons: firstly in recognition of the great importance of the Census as a unique source of information on the Canadian people and, secondly, as an indication to users of the great wealth of unpublished information which can be obtained from Statistics Canada. A serious search for information should not be curtailed simply because the answer is not to be found in a formal report or book. Statistics Canada does not claim to be able to answer everyone's questions but is has a lot more answers than may at first be apparent.

The Census of Population and Housing

The vast amounts of data collected in the Census every five years give rise to hundreds of publications but this is only the tip of the iceberg. Modern technology makes it possible to analyse this information in so many different ways that the bureau has to be very selective when deciding what will be published in the formal reports. It is keenly aware that the rest of the information, while not of sufficiently broad interest to warrant formal publication, is still of great value to researchers and analysts. In recognition of this it has developed facilities for providing both standardized and custom tailored material in response to specific requests. The following are the major products and services available from this program:

Computer printouts, microfilm (1971) and microfiche (1976). In addition to the tabular results released in the form of reports or bulletins, a large number of tables have been produced as computer printouts. These tables can be made available as photocopies or on microfilm (for the 1971 Census) and microfiche (for the 1976 Census). Data in these formats are individually prepared on request and a charge is made to cover the cost of reproduction.

More information on the microform data can be supplied by any of the reference centres across Canada (see list page 57).

Maps and geographic reference materials. Large scale maps depicting the boundaries of the census enumeration areas and other statistical areas can be purchased.

These include an urban map series, a rural map series and a Census Tract Map series showing enumeration areas (i.e., the territory covered by each enumerator in taking the census). In addition, various small scale maps are available depicting census divisions and other statistical areas.

Magnetic tape files. Area Master Files describe the street network and other physical features as defined by means of geographic co-ordinates within census metropolitan areas. The Geography Tape File links the smallest unit of collection, namely enumeration areas and corresponding centroids to all higher level geographic codes such as federal electoral districts, municipalities, counties, cities, towns, villages, etc., for all of Canada. This file also provides a linkage between Census and Standard Geographic Codes.

Special tabulations. Insofar as confidentiality constraints permit, Statistics Canada will produce for users, at cost, special computer tabulations not included in the main program. These can include statistics produced for non-standard geographic areas as defined by individual users. Special tabulations can be produced in hard copy (print-out) form or on magnetic tape.

How to order. Maps, printouts, microform, computer tapes and special tabulations: Requests for all materials other than printed reports can be addressed to any of the reference centres across Canada (see list page 57).

Maps, tabulations and microfilm can be ordered from the indexes available from reference centres by specifying the nature of the data required.

Bibliography of papers and reports in the census internal series. This bibliography covers works produced by census researchers in the period 1965 - 75, and is the sequel to *A Bibliography of Canadian Demography, Technical Paper No. 5 (1966).* The Bibliography lists reprints of articles which census stall published in journals or in official proceedings of conferences; analytical and technical memoranda dealing with technical aspects of census information; working papers and research memoranda, which contain tentative ideas and discussions of a wide range of census subjects; planning and procedural memoranda, which provide a means for the dissemination of information pertaining to census plans and procedures; and results memoranda which provide detailed descriptions of census operations or procedures. Updates to this Bibliography will be issued as required. Requests for copies should be forwarded to:

Central Inquiries,
Statistics Canada,
Ottawa, Ontario.
K1A 0T6

Section II

Using the Data

USING THE DATA

General Rules

Statistics are not difficult to use in many applications but there are a number of pitfalls for the unwary and, while some can be avoided by common sense, others might not be apparent to the inexperienced user.

Reading Statistical Tables

First, users should always consult the Introduction, Footnotes, Explanatory Notes and Definitions published with the statistics to be quite sure of what the figures measure. These notes give a clear explanation of the definitions and concepts used. If you need further information, contact a Statistics Canada reference centre. This is very important, as statistics which are widely quoted in the press and on radio and television can be very misleading or inconclusive for some purposes. For example, a city once claimed to be "the healthiest in the nation" because it had the lowest death rate. What was not mentioned was the fact that the city had no major hospital and the most serious cases were hospitalized in neighbouring cities. Deaths are recorded where they actually occur.

When reading a table check what the numbers measure. It may be volume, value or the numbers may be expressed as an index (see page 43). If two numbers have to be added, make sure they are compatible. Also check if the numbers are totals, sub-totals or are cumulative and be sure that you have the figures you want. Quite often monthly figures are accompanied by year-to-date figures in which case the December figures may in fact be annual figures. Always check the column headings and the subtitles carefully to be sure you are clear on the units used (for example the number may be in thousands or millions).

The Effects of Confidentiality on Statistical Tables

In some tables you may find that a number has been replaced by an "x" and a footnote stating that the number is confidential. Statistics Canada is governed by the Statistics Act which requires Canadians to provide Statistics Canada with the information it requests, while at the same time guaranteeing that the information provided will be kept confidential.

The Act forbids Statistics Canada to publish any information which can be related to one person or one company. For industrial statistics, this requirement is generally satisfied by adherence to the "rule of three", that is, that no figure which is made up of data on fewer than three companies can be published because one of the two would automatically know the facts about the other. While there are usually more than three companies in an industry in Canada, there are often only two in a province or only two which make, or export, a particular product. Even when there are more than three companies, it is sometimes necessary to suppress the figures because one firm dominates to such an extent that to publish

ITEMS TO NOTE WHEN READING A TABLE

Title: Does it cover what is needed?

Time Period: Is the period covered the period required?

TABLE 33 Expenditures on Elementary and Secondary Education, per Pupil of Enrolment in Public Schools, Canada and Provinces, 1973 and 1974[1]

	Total Expenditures			Enrolment[3]	Expenditure per pupil[2,3]	
	Total	By school board	Other departmental expenditures		Of school boards only	Including other departmental expenditures
	$'000			No.	$	
Newfoundland:						
1973	132,734	104,774	27,960	159,831	656	830
1974	141,282	..	..	158,014	..	894
Prince Edward Island:						
1973	28,668	21,070	7,598	29,056	725	987
1974	33,608	..	..	28,149	..	1,194
Nova Scotia:						
1973	172,996	153,254	19,742	207,651	738	833
1974	197,287	..	..	204,280	..	966
New Brunswick:						
1973	132,043	105,840	26,203	170,179	622	776
1974	178,908	..	..	166,550	..	1,074
Canada:[4]						
1973	5,867,706	5,339,476	528,230	5,476,733[5]	975	1,071
1974	6,628,676	..	..	5,418,854[5]	..	1,223

1 1974 Data for are estimated.
2 These figures overstate expenditure per pupil to some extent because school board expenditures include amounts spent for providing various evening programs.
3 In this table data of a given year for regular public elementary and secondary schools are related to fall enrolment of the same year.
4 Includes Yukon, Northwest Territories and undistributable expenditures.
5 Includes enrolment of Yukon, Northwest Territories and overseas.

Column Heading: Do you want the total or individual items?

Units: Is it in hundreds, thousands or other?

Value Indicator: Is it dollar or volume unit or an index?

Classifications: (Periods, subject breakdown, area breakdown, etc.). Do they cover what is needed? Do you want the individual figures, subtotals or totals?

Footnotes: Always check footnotes as they may clarify the data and provide the "ifs", "ands" and "buts".

Symbols

The following standard symbols are used in Statistics Canada publications:

. . figures not available.

. . . figures not appropriate or not applicable.

– nil or zero.

- - amount too small to be expressed.

P preliminary figures.

r revised figures.

x confidential to meet secrecy requirements of the Statistics Act.

the industry's figures would risk disclosing that company's information. Statistics Canada also has to ensure that it does not divulge confidential information by residual disclosure. If, for example, publishing information on a particular industry in Prince Edward Island is prohibited because there is only one manufacturer for that industry in Prince Edward Island, it is obviously impossible for Statistics Canada to publish statistics on that industry for each of the other provinces and territories and for Canada as a whole. If it did, it would be a simple matter to work out the figures for Prince Edward Island and, thereby the figures for the only company located there. In these cases Statistics Canada has to suppress the figures for at least one other province or publish only national or regional figures.

Another procedure employed by Statistics Canada to protect the confidentiality of the data it receives is random rounding. This is a statistical technique whereby the final digit in every number in a table is rounded up or down to a 0 or a 5. This technique is used in the Census of Population tables where there is a danger of an individual being identifiable. For example, the Census Tract series (cat. no. series 95) provide detailed data relating to age, sex, education, housing, employment, income, etc., of a small urban area, often covering only one or two city blocks. Because of the possibility (albeit remote) of disclosing information about an individual, many of the numbers are rounded up or down so the last digit is a 0 or a 5. These numbers are selected on a random basis to be rounded either up or down so it is impossible for users to work out the precise figure. This sometimes leads to the sums of individually rounded numbers not being exactly equal to the total as shown in the table. However, such slight changes in the numbers do not have a significant impact on the usefulness of the data for statistical purposes.

Making Comparisons

Make sure you compare like with like – both when using two or more published numbers or when comparing your own figures with published data. For example, some accounting terminology can be misleading and if you are checking a company's figures against data for the whole industry, read the definitions to be sure of what the published figures include and exclude.

Do not confuse commodity data with industry data. For example, shipments of furniture include shipments of furniture from all companies – whether or not they are classified to the furniture industry. On the other hand, the value of shipments from, for instance, meat processors includes more than just the value of meat products. It can also include chemicals, oils, soaps and any other products meat processors may be producing. This distinction is very important when using statistics from two or more sources. For example, when using import and export statistics with shipment data, make sure you have shipments of commodities and check the classification definitions to be sure they are comparable (see page 33 for further information).

Drawing Conclusions

Be careful not to jump to conclusions too quickly. For example, be wary of simple averages, they include extreme values. If three photographers have an average income of $14,000 a year, then individual incomes could be $5,000, $8,000 and $29,000, in which case the majority earn far less than the average.

Similarly, a word of caution about forecasting. Everybody forecasts – whether a manufacturer, retailer or head of a family. Forecasting is necessary as many plans for the future require some action in the present. There are many methods of forecasting but they all involve using information about the past and present. If you study data for a period of time in the past and see a trend developing you may be inclined to forecast something in the future, based on the assumption that what has happened in the past will continue to happen. Remember that any such projection of past experience into an uncertain future involves a risk and should not be undertaken without consideration of other information on possible future developments or factors which could cause a change. It is also wise to recognize that some statistical studies require the services of specialists – consultants trained in market research, forecasting, etc. Nobody should be frightened of using statistics but everyone should realize when they are out of their depth and it is time to bring in the experts.

Statistical Standards and Classification Structures

The need for users to know exactly what data represent, and to be able to compare statistics from different sources, makes it necessary for the people collecting statistics to use reasonably consistent definitions of the various characteristics being measured.

This presents a problem because most characteristics developed in statistical data have no single commonly accepted definition in general use. For example, does one define a gasoline station as an establishment in the petroleum industry or in the service industries? Is a 15-year old who is looking for work too young to be counted with the officially unemployed? What occupational title do you give to a factory worker who spends all day drilling holes in engine blocks?

As the central statistical agency in Canada, Statistics Canada is working to encourage the standardization of concepts and terms used in statistical data of all types. For many statistics there are wide variations in the meaning and interpretation of terms and concepts used, both by the professional and the public.

When seeking information on statistical units or characteristics presented in Statistics Canada publications, the first approach should be to refer to the Explanatory Notes included in the publication itself. If this does not provide a satisfactory explanation, Statistics Canada reference centre staff (see list page 57) will be happy to assist by providing further details where possible.

The *Social Concepts Directory for Statistical Surveys* (non-catalogued publication) provides generally acceptable definitions and classifications for many of the concepts identified in statistics dealing with social phenomena.

National Income and Expenditure Accounts – Volume 3 (cat. no. 13-549E) offers a guide to the National Income and Expenditure Accounts maintained by Statistics Canada. Included with its description of the System of National Accounts, are definitions of many concepts used in statistics which measure economic phenomena.

Classifications

Standard classification structures are used to organize statistics on industry, occupation and other important characteristics which must be categorized in some way in order to produce statistics on them. Classification structures set out distinct groups, sub-groups, and so forth and include some form of definition for each of these.

One important benefit of these structures is to allow statistics from one source to be more comparable with statistics from another. If there were no **standard** classification structures, the data obtained from different surveys would be collected and compiled on an *ad hoc* basis without regard for comparable informa-

tion elsewhere. For example, if separate surveys for employment and for production of an industry used different definitions of the industry, and therefore included and excluded different units in that industry, it would not be possible to compare the results of the two surveys. This would obviously limit the usefulness of both surveys. If the maximum potential of all available statistics is to be realized it is important that standard classifications be adopted and that they have precise definitions and rules governing their application. In addition, it is necessary that both those who compile statistics and those who use them appreciate the nature of the classifications and the means by which they are applied in practice.

Four of the more important standard classification structures are those used for industries, commodities, occupations and geography. Although there are obvious relationships between each of these concepts they must be identified separately for statistical purposes.

Industrial Classifications

An **industry** is defined as a group of operating units, such as companies or establishments, engaged in the same or similar kinds of economic activity – e.g., logging camps, coal mines, clothing factories, department stores, laundries. The term **industry** is used in its broader sense to include all economic activities ranging from the primary industries, such as agriculture and forestry, to those concerned with providing a service, such as barber shops and consulting services and the various government functions. The classification of industries used by Statistics Canada (and by many others) is the **Standard Industrial Classification** (SIC). The SIC has four levels of classification – "Divisions", "Major Groups", "Industry Groups" and "Industry". The following illustrates how some of the activities in the Transportation Equipment Major Group are classified.

Division 5 – Manufacturing Industries

Major Group 15 – Transportation Equipment Industries

Industry Group

321 Aircraft and Aircraft Parts Manufacturers
323 Motor Vehicle Manufacturers
324 Truck, Body and Trailer Manufacturers

Industry

3241 Truck Body Manufacturers
3242 Non Commercial Trailer Manufacturers
3243 Commercial Trailer Manufacturers

325 Motor Vehicle Parts and Accessories Manufacturers
326 Railroad Rolling Stock Industry
327 Shipbuilding and Repair

328 Boatbuilding and Repair
329 Miscellaneous Vehicles Manufacturers

Amendment to a widely used classification system such as the SIC inevitably causes concern as it disrupts the continuity of statistical time series. However, periodic review and amendment are necessary to reflect structural changes in the industrial make up of the country as new industries emerge and obsolete ones disappear.

The SIC was first formalized in 1948. It was subjected to a major revision in 1960 and updated in 1970. A further revision will be completed for 1981. It is important when using data from different surveys or for different time periods to ensure that the same version of the SIC is used.

The latest available industrial classification at the time of this handbook going to print is set out in the *Standard Industrial Classification Manual, Revised 1970* (cat. nos. 12-501E and 12-501F). The Introduction to the Manual explains the classification structure and gives an extensive index to identify the appropriate industry class for various types of production or activities.

The SIC is sufficiently general that it can be used to classify more than one type of reporting unit. For example, either a company, a part of a company or a group of companies could report statistics as a single unit. The classification of a reporting unit to a particular industry is based on its principal activity. In most cases the principal activity is readily apparent but in some cases, where an establishment is involved in more than one activity (for example manufacture and wholesale or retail trade), the principal activity has to be determined.

This is done by measuring the contribution of each activity to the "value of gross output" in manufacturing companies and to an equivalent measure in other industries (e.g., "mark up on sales" in retailing and the difference between value of work done and the cost of materials and supplies used, and payments to sub-contractors in the construction industry). This measurement is known as "census value added" and in all cases very precise rules for calculating it are set out.

Each establishment is assigned wholly to the industry of its principal activity and its total output and input is included in the measures of output and input for that industry. The establishment concept was developed to provide a statistical unit which would minimize the effect of secondary activities on industrial statistics while approximating the value added. But the secondary activities can obviously have a significant impact in some industries and users should be aware of this.

Industrial codes for companies are assigned on the basis of the codes for their establishments. For multi-establishment companies having establishments classi-

fied to different industries, the industrial code assigned to the company as a whole is the one assigned to the establishment (or establishments in any one industry) that account for the principal share of the "census value added" or equivalent for the company as a whole. A detailed explanation of the classification of companies and establishments is given in the SIC Manual. This includes an explanation of the various reporting units used for industrial statistics – "establishments", "companies" and "enterprises" and how these affect published statistics.

A final warning to users – the United States Industrial Classification is similar to the Canadian SIC but the actual groupings and their respective codes used may vary significantly from those of the Canadian SIC.

Commodity Classifications

All economic activity may be divided between that concerned with the production of physical goods such as the growing of apples, the fabrication of metal pipe or the compounding of chemicals and with the provision of services like hair cuts, dry cleaning of clothes, bus rides or the lending of money. Taken together the physical goods and the services are commonly referred to as commodities. While goods and services have a good deal in common, they are quite distinct in their character and total make up.

Some commodities tend to be associated with particular industries but in fact one rarely finds an industry which produces only one type of commodity. For example, although one refers to the "automobile industry", the "rubber industry" and the "electrical appliance industry", in fact each of these produce a variety of commodities some of which are also produced by companies or establishments classified to other industries.

Although efforts have been made to standardize commodity classifications so that comparable data can be obtained, there is as yet no single classification which is suitable for all purposes. However, all the goods classifications used by Statistics Canada are based on the Standard Commodity Classification (SCC) as set out in the *Standard Commodity Classification Manual* (cat. no. 12-502). This reference structure, which was last revised in 1972, consists of five sections which are subdivided into 87 divisions, 484 groups and 5,864 commodity classes. The SCC Manual is supplemented by a Numerical Index, which assists in defining the content of classes and by an Alphabetical Index, to facilitate reference to some 55,000 commodity items.

The SCC itself is seldom used directly in coding statistics but it serves as the basis for the Export Commodity Classification (XCC) and the Import Commodity Classification (MCC) which are used to classify Canada's external trade in goods. It is also the basis for the Industrial Commodity Classification (ICC) which is used in the Census of Manufactures to record material used and shipments of domestically produced goods. These three classifications differ only

slightly from the base SCC, and from each other. Each has been developed to more closely reflect the pattern of trade or production for which it is used to code statistical data. When one considers the wide range of products produced, imported and exported by Canada, and the consequent need for greater or lesser detail, it is easy to understand how the different classifications have developed. The nearly 6,000 commodity classes in the SCC have been expanded to more than 7,000 classes in the ICC and compressed to about 2,500 import classes and 1,500 export classes.

Details of the three classification structures are published in the *Industrial Commodity Classification Manual* (cat. nos. 12-541E and 12-541F) and the *Trade of Canada Commodity Classification* (cat. nos. 12-520E and 12-520F) which sets out the XCC and MCC side by side. Another goods classification which deserves mention is the *Canadian International Trade Classification* (CITC) which is published in cat. nos. 12-544E and 12-544F. It has a seven-digit code which is basically an extension of the import commodity code, to account for data in greater detail. The development and implementation of the CITC has been a co-operative undertaking by Statistics Canada and the Department of National Revenue.

Finally, a classification for services or intangible goods based upon the kind of service is contained in the *Draft Standard Classification of Services, Technical Bulletin No. 5.* All services are grouped under seven main sections that are further subdivided into divisions and major groups that provide a total of about 970 unique service classes. The service classes set out in this bulletin are brought together without regard to the industry in which they happen to be produced. Those interested in the subject will find this work a useful introduction to the broad scope of services. Meanwhile, work continues on ways to structure services by industry of origin as a significant addition to this important area of economic activity.

Occupational Classification

An occupation is defined as a collection of jobs sufficiently similar in their main tasks to be grouped under a common title for classification purposes. A job, in turn, encompasses all the tasks carried out by a particular worker to complete his duties.

The source for information on occupational classification is the *1971 Occupational Classification Manual* (cat. nos. 12-536E and 12-536F). This Manual, which will be up-dated for 1981, provides a systematic classification structure to identify and categorize the entire range of occupational activity in Canada using as its basic classification principle the **kind of work performed.**

The classification structure for both the 1971 and 1981 Manuals consists of three levels of occupational categorization, each providing successively finer detail: major groups, minor groups and unit groups. The following is an example of how the classification is structured.

Major Group 21 – Occupations in Natural Sciences, Engineering and Mathematics

Minor Group 211 – Occupations in Physical Sciences

Unit Group
2111 – Chemists
2112 – Geologists
2113 – Physicists
2114 – Meteorologists
2117 – Physical Sciences Technologists and Technicians
2119 – Occupations in Physical Sciences, not elsewhere classified

The *Occupational Classification Manual* contains the classification structure and definitions for the major, minor and unit groups as well as two separate indexes. A Classified Index lists individual occupational titles arranged alphabetically within their respective major, minor and unit groups. An Alphabetical Index presents the occupational titles in alphabetical order, irrespective of group association.

When the revised Manual is released in 1981, it will be published separately in both official languages. An important improvement on the 1971 structure will be that the French version will include only titles commonly used in French and not be simply direct translations of the English titles.

Detailed information on the tasks associated with a particular occupation can be found by consulting the *Canadian Classification and Dictionary of Occupations* (CCDO).

Geographical Classifications

When organizing data for release, Statistics Canada conforms to major political and administrative boundaries. To meet needs requiring data for very small areas, the bureau has devised additional geographical or area systems which subdivide the larger political and administrative units.

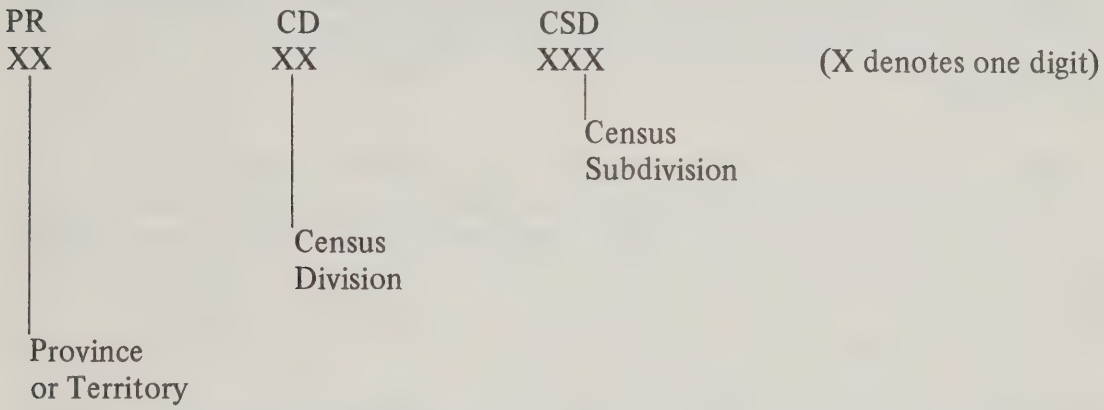
The more important area systems are the following:

Name of area system	Number of units June 1st, 1976	Covers all of Canada
Province (PR)/Territory	12	Yes
County/Census Division (CD)	260	Yes
Municipality/Census·Subdivision (CSD)	5,556	Yes
Census Metropolitan Area (CMA)	23	No
Census Agglomeration (CA)	88	No
Provincial Census Tract (PCT)	1,715	No [1]
Census Tract (CT)	2,685	No [1]
Enumeration Area (EA)	35,154	Yes

[1] Taken together, these two systems cover all of Canada.

Several of these area systems are hierarchically related to each other. For example, **census subdivisions** (CSD) aggregate to **census division** (CD), and **census divisions** aggregate to **provinces** (PR). The smallest unit, the **enumeration area** (EA) aggregates to all the other areas. An enumeration area covers about 300 households, typically several city blocks or a single large building in urban areas.

The basic framework for coding geographical areas is the **Standard Geographical Classification** (SGC). It provides a seven-digit code which identifies provinces, census divisions, and census subdivisions in the following manner.



Census divisions comprise the middle level of the SGC hierarchy. They are intended to be stable over long periods of time (30-40 years) and, therefore, are useful for the historical analysis of statistical series. At the present time there are seven types of census divisions. These are: county, census division, territory, regional municipality, district, regional district and region.

There are three basic types of **census subdivisions**, the lowest level of the SGC hierarchy: (a) organized (incorporated) municipalities with authority to levy taxes, and some form of elected government (e.g., city, town, village, township); (b) organized subdivision delimited by Statistics Canada; and (c) Indian Reserves.

Because of the need for data on smaller areas than set out in the SGC, the Census of Population and Housing subdivides large urban centres into **census tracts** (CT). Census tracts have a population of approximately 5,000, and along with **provincial census tracts** (PCT), are the only permanent geostatistical areas defined by Statistics Canada. The population of a provincial census tracts is in the same range as that of a census tract.

Below the census tract level, census data can be obtained for **enumeration area**. In the rural parts of Canada the EA is the only defined geostatistical area below the census subdivision.

Because of the great interest in Canada's larger urban areas Statistics Canada has delineated **census metropolitan areas** (CMA), urban centres with a population in excess of 100,000, and **census agglomerations** (CA), urban centres with popula-

tion below 100,000. Each CMA and CA is a grouping of municipalities which are in close socio-economic contact as indicated by census travel-to-work data.[1]

Another important geographical area is the **federal electoral district** (FED). Each FED elects one member to the House of Commons. Federal electoral districts can cut across the boundary of any other area system except for the enumeration area.

The framework of geographic areas for the 1971 Census of Population and Housing was made even more flexible for large urban areas by the introduction of the Geographically Referenced Data Storage and Retrieval System (GRDSR) sometimes called the geocoding system. The very small base unit of this system – one side of a city block – enables the user to designate his or her own areas for data retrieval.

There are other area systems in use outside Statistics Canada for which the bureau does not publish data. Most of these can be expressed in terms of Statistics Canada areas and the bureau will co-operate with users in relating user defined areas to the geostatistical areas used by Statistics Canada. An important tool in this regard is the **Postal Code – Geographical Classification Code Conversion** File, which was developed by the Standards Division of the bureau. Statistics Canada area systems are updated periodically to reflect changes in political and administrative boundaries, growth and shift in Canada's population, and for other reasons.

The master file of the **Standard Geographical Classification** is updated annually to reflect changes in the boundaries, names, and status of census subdivisions, but users are encouraged to utilize the codes contained in the 1976 Manual of the Standard Geographical Classification.

The amount of geographic detail that Statistics Canada can publish is determined by the type of data collected, by the feasibility of assigning a location to certain types of data, by sample size and by other factors influencing statistical reliability, as well as by the confidentiality provisions of the Statistics Act. In some cases, data are only available at the Canada level while in others, geographic detail is limited to the provincial or Census Metropolitan Area level. Only the Censuses of Population and Housing release data for areas smaller than census subdivisions (usually municipalities).

All definitions provided in this section are brief summaries of the official and complete definitions which are available from the Social Statistics Field. Inquiries regarding the Standard Geographical Classification and postal code conversion to other types of areas should be directed to Standards Division of the bureau.

[1] Except for the Calgary CMA and the Saskatoon CMA which consist of the cities of Calgary and Saskatoon only.

Some Basic Statistical Techniques

Percentages

One of the most frequently used forms of representing statistics and one that is used extensively in Statistics Canada publications, is percentage. Although percentages are not difficult, they do sometimes cause trouble for people who are not statistically or numerically minded.

Per cent simply means "per hundred" and the symbol used to express a percentage is %. One per cent (or 1%) is simply one hundredth of the total or whole and is therefore calculated by dividing the total or whole number by 100.

$$1\% \text{ of } 250 = \frac{1}{100} \times 250 = 2.5.$$

To calculate a given percentage of a number, simply divide the total number by 100, and then multiply the result by the requested percentage:

$$12\% \text{ of } 250 = \frac{12}{100} \times 250 = 30.$$

To calculate what percentage one number is of another number, change this equation around and multiply the first number by 100 and then divide the result by the second number:

$$30 \text{ as a } \% \text{ of } 250 = \frac{30}{250} \times 100 = 12\%.$$

If, as is often the case with statistical data, one has a series of numbers and each of these has to be expressed as a percentage of the total then one simply adds the numbers in the series to find the total (i.e., the number equal to 100%) and carries out the above calculation for each number in the series.

For example. Given the series 30, 150, 70:

The total would be $30 + 150 + 70 = 250$

$$30 \text{ as a } \% \text{ of } 250 = \frac{30}{250} \times 100 = 12\%$$

$$150 \text{ as a } \% \text{ of } 250 = \frac{150}{250} \times 100 = 60\%$$

$$70 \text{ as a } \% \text{ of } 250 = \frac{70}{250} \times 100 = 28\%.$$

If the percentages for each number in the series are added together they equal the percentage for the whole:

$12\% + 60\% + 28\% = 100\%.$

To calculate the percentage difference between two numbers, the same basic calculations are used. For example, to find out the percentage increase from 250 to 280, the difference between the numbers is calculated:

$280 - 250 = 30$

and then expressed as a percentage of the first, or base, number:

$$\frac{30}{250} \times 100 = 12\%.$$

Determining the whole number (i.e., the value of 100%) when only the value of a given percentage is known, is another calculation which is often useful. For example:

if 280 is known to be 112%

then 1% must be $\frac{280}{112} = 2.5$

and 100% must be $\frac{280}{112} \times 100 = 250.$

One of the principal reasons why percentages are so widely used is that they enable a number of different things to be expressed on the same base so that they can then be compared.

For example, if the price of sausages increased from $1.65 per pound to $1.89 and the same quantity of wieners went from $1.26 to $1.62, the two increases could be expressed as percentages:

Sausages:

$\$1.89 - \$1.65 = \$0.24$

$\$0.24$ as a % of $\$1.65$ is $\frac{\$0.24}{\$1.65} \times 100 = 14.5\%$

Wieners:

$\$1.62 - \$1.26 = \$0.36$

$\$0.36$ as a % of $\$1.26$ is $\frac{\$0.36}{\$1.26} \times 100 = 28.6\%.$

It is now easy to see that the price increase of wieners was much higher than that for sausages.

It should be remembered that comparing percentages which have significantly different bases can create a false impression. For example, the change from one to two is 100% whereas the change from 5,000,000 to 6,000,000 is only 20%.

Index Numbers and Indexes

Index numbers are a statistician's way of expressing the difference between two measurements by designating one number as the "base", giving it the value 100 and then expressing the second number as a percentage of the first. For example, if the population of a town increased from 20,000 in 1972 to 21,000 in 1975, the population in 1975 was 105% of the population in 1972. Therefore, on a 1972 = 100 base, the population index for the town was 105 in 1975.

An "index", as the term is generally used when referring to statistics, is a series of index numbers expressing a series of numbers as percentages of a single number. For example, the numbers

50 75 90 110

expressed as an index, with the first number as a base, would be

100 150 180 220.

Indexes can be used to express comparisons between places, industries, etc., but the most common use is to express changes over a period of time, in which case the index is also a time series or "series". One point in time is designated the base period – it may be a year, month, or any other period – and given the value 100. The index numbers for the measurement (price, quantity, value, etc.) at all other points in time indicate the percentage change from the base period.

If the price, quantity or value has increased by 15% since the base period the index is 115; if it has fallen 5% the index is 95. It is important to note that indexes reflect percentage differences relative to the base year and not absolute levels. If the price index for one item is 110 and for another is 105 it means the price of the first has increased twice as much as the price of the second. It does not mean that the first item is more expensive than the second.

Each index number in a series reflects the percentage change from the base period. It is important not to confuse an index point change and a percentage change between two index numbers in a series. For example, if the price index for butter was 130 one year and 143 the next year, the index point change would be:

$143 - 130 = 13$

but the **percentage** change for the index would be:

$$\frac{143 - 130}{130} \times 100 = 10\%$$

Means and Medians

These are both ways of expressing a series of numbers by a single number. The mean most frequently referred to in Statistics Canada's publications is the arith-

metic mean. It is what most people call the "average" and is calculated by adding up the numbers in the series and dividing the total by however many numbers there are. For example, if five children are ages 3, 4, 5, 8 and 10, their mean age is:

$$\frac{3+4+5+8+10}{5} = 6.$$

The median is the value of the middle number of a series ranked in order of size. For example, given the ages of five children as 5, 4, 8, 3 and 10, to find the median age the series would first have to be rearranged in order of size, i.e., 3, 4, 5, 8, 10, and the value of the middle number, i.e., 5, would be the median age.

Current and Constant Dollars

When statistical tables give the value of, for example, sales, inventories or investment in current dollars, it simply means the values are expressed in terms of their price or cost at the time the survey or measurement was taken. However, the value (or purchasing power) of the dollar changes over time with inflation or deflation. For example, statistics may show that wages have increased substantially over a given period; but if prices have also gone up, the purchasing power of each wage dollar has decreased. To find out how much "real" wages, as opposed to cash wages, have increased, the wages have to be expressed in dollars which have a constant value over time, i.e., in constant dollars. Constant dollars can be used for any value which is expressed in dollars, or for indexes which reflect dollar values. When constant dollars are used in a statistical table, the value of the dollar in one particular year is selected and that year is always clearly stated. At present, most constant dollar series use 1971 dollars as that is the base year for most major national and international indexes.

Seasonal Adjustment

In Canada, the changing climate, or consumer habits related to it, affect nearly all business activity. Construction slows down in winter; tourism increases in summer; the Christmas season brings out far more shoppers than any other. The demand for particular goods and services changes along with the season; consumers want boots in winter, swim suits in summer and so on. This sometimes makes it difficult to determine the underlying trend from an examination of a series of month-by-month figures.

For this reason, many series are adjusted to remove the effect of seasonal variations. To do this, seasonal factors for each month are calculated. For example, if, in a typical year, sales in jewelry stores in March are 84% of average monthly sales, the seasonal factor for March for jewelry stores sales would be 84. (Average monthly sales are the total annual sales divided by 12.) If sales in December are 140% of the average month's sales, the December seasonal factor would be 140.

Usually about seven years of data in a series are required to provide a satisfactory basis for estimating seasonal factors. Once the seasonal factors are es-

timated the seasonally adjusted series is calculated by dividing the value, quantity or index for each month by the monthly factor for that month, and multiplying by 100 because the factor is a percentage.

Here is an example of a series on department stores sales in Canada showing the monthly dollar value of sales, the seasonal factors and the seasonally adjusted value of sales. Note that the seasonal factors themselves add up to 1,200 (12 x 100%) and that the unadjusted and adjusted figures add up to the same total. Thus the adjustment process simply reallocates the annual total among the 12 months, but in such a way as to bring out the underlying trend more clearly. It provides answers to questions such as, "How do January figures compare with those of December, bearing in mind that December is always more than twice as busy a month as January?".

Department Stores Sales, Canada, 1978

Month	Unadjusted or actual sales (1)	Monthly factor (2)	Seasonally adjusted sales $\frac{(1)}{(2)} \times 100$
	millions of dollars		millions of dollars
January	436.6	72.54	601.9
February	416.9	68.70	606.8
March	536.6	87.27	614.9
April	562.2	92.01	611.0
May	611.3	97.79	625.1
June	600.1	96.74	620.3
July	550.4	87.39	629.8
August	609.5	93.51	651.8
September	699.6	105.71	661.8
October	649.7	98.63	658.7
November	831.4	124.00	670.5
December	1,190.4	174.29	683.0

Sales are not the only figures which are seasonally adjusted. Employment, inventories, consumer credit, some consumer price indexes, industrial production and a number of other series are published both seasonally adjusted and unadjusted.

Statistical Precision

Very few statistics can be expected to be 100% precise. Organizations with a professional interest in producing statistical data, such as Statistics Canada, pride themselves on publishing high quality data that are as accurate as is possible within the bounds of reasonable cost and good statistical practice. The goal is always to minimize the sources of possible error and to identify where inaccuracies may occur.

In the terminology of statisticians, the sources of possible inaccuracies are referred to as types of "errors". However the use of this term does not necessarily infer that a mistake has been made.

Statistics gathered from surveys are subject to two basic types of error – sampling error and non-sampling error. Where statistics have been compiled by surveying a random sample from a larger group and then using the sample to infer values applying to the larger group, there exists a sampling error. This is simply the error that may result from not having counted the whole of the group. The probability of sampling error can be predicted within known ranges according to the size of the sample, and the size of the sample is selected according to the sampling error that is acceptable for the purposes of the survey.

Non-sampling error includes the error from all other possible sources and it may occur both in sample surveys and in full census surveys (100% sample). Non-sampling error may occur from a number of different sources such as respondents failing to fill out questionnaires correctly, from failure to contact all respondents, or from activities in the process of computing statistics from the individual responses.

To the extent that these errors occur with a persistent bias, they may affect the statistics produced. For example, if people refuse to answer questionnaires or are not at home when interviewers visit their houses to count unemployed people, and these houses missed are houses more likely to shelter unemployed people, there will be a bias introduced which will tend to undercount the unemployed. However, if the error occurs in a random fashion, the effect on the data is likely to be minimal, especially when appropriate quality control measures are applied.

Another factor of which users should be aware is that all published data are, to some degree, out of date. Some statistics, such as the CPI, are published very quickly. Others may have a time lag of a year or two because the information is collected over a lenthy period and then the processing of the data takes further time. Some data are regularly published in two editions – termed preliminary and revised. This is done principally in order to be able to release the best data possible at an early stage and then to release more accurate data later when further survey returns are available. Where data released in Statistics Canada publications are preliminary, they are indicated either by a lower case "p" or an explanatory

note for the data. Revised figures are similarly indicated by a lower case "r" or an explanatory note. (See page 30 for list of standard Symbols used with Statistics Canada tables.)

Because published data cannot be regarded as 100% precise and can only be released after the time necessary to collect and process them, users should avoid making too precise judgements on the basis of statistics alone.

Section III

Statistics Canada's User Services

STATISTICS CANADA'S USER SERVICES

The following are some of the services which Statistics Canada provides to help users acquire and use data. Many of these are carried on by the Marketing Services Field of Statistics Canada, which is specifically charged with responsibility to promote data use and assist users. However, this is not to suggest that users should not contact the statisticians responsible for a particular data series if they wish to. All divisions of Statistics Canada maintain close contact with users of their data and are happy to be of assistance. The need for the more general user services results from the fact that users often experience difficulty in identifying or locating the most appropriate person to help them. Also, many data users are interested in more than one type of data and either do not have the time to consult a whole string of people or prefer to discuss their problem with someone closer at hand and who has a more general perspective on the data produced and their uses.

User Advisory Services

The advisory services offered by Statistics Canada to the public include statistical reference centres in nine cities across Canada. Each of these regional reference centres maintains collections of Statistics Canada publications and unpublished material, plus some other government and non-government statistical publications. The centres are staffed by knowledgeable inquiries officers who each year answer over 200,000 requests for statistics or for advice on the meaning and use of data. Most inquiries are received by telephone but many are by letter or from visitors to the reference centres which are open during normal working hours. Study areas and photocopying facilities are provided. Each regional reference centre has one or more Regional Advisors who are responsible for maintaining local liaison between Statistics Canada and data users in government, business, labour, institutions and educational establishments. They promote the use of statistics through visits, talks and meetings including participation in conferences, seminars, workshops, displays, etc. **They also assist experienced and inexperienced users with individual data problems.** An important part of their role is to provide valuable feedback to bureau staff in Ottawa on the statistical needs and problems of users so as to help improve the content and availability of Statistics Canada's products and services.

The following are some of the specific services provided by the User Advisory Services regional reference centres:

- answering requests for data or for information on such things as statistical or definitions. This may include providing information in advance of receipt of the publication, suggesting alternative sources of information or if necessary, referring users to the appropriate subject matter specialists in Ottawa;
- providing advice on how data may be used to solve particular problems;
- assisting with the ordering of Statistics Canada publications;
- providing training sessions, workshops, lectures, etc., on the availability, use, etc., of statistics. These may be of a general nature or related to particular data interests;
- providing display materials for conferences, meetings, etc. Again this can be general material reflecting the range of Statistics Canada's output, or it can be geared to a particular theme or subject;
- providing data from, or information on, CANSIM. All the regional reference centres have computer terminals which can access CANSIM data. Small, *ad hoc* retrievals can be performed. Large requests may be channelled to the CANSIM staff in Ottawa and users will be billed on a cost recovery basis. Regional advisors will provide information on CANSIM, including demonstrations to interested users;
- providing advise on the establishment and maintenance of data collections.

A list of the regional reference centres of User Advisory Services is given on page 57.

The Statistics Canada Library in Ottawa

This library is situated on the second floor of the R.H. Coats Building, Tunney's Pasture, Ottawa. Although its major function is to provide reference material and library services to the bureau's staff, the library also makes its resources and services available to other government departments and to the general public.

The library's main holdings are in the field of socio-economics and related disciplines. It houses a complete collection of Statistics Canada publications and their predecessors back to 1841, plus extensive holdings of Canadian and foreign government documents and supporting monographs, together with the required bibliographies, indexes and other reference tools. In total a collection of approximately 100,000 volumes and more than 3,000 periodicals is maintained.

The library is open during normal business hours and has extensive work areas, plus a few private studies which may be reserved for periods of time.

Reference services available from the library include searching for information contained in the library's collection; providing bibliographic information; preparing subject bibliographies on request; locating and obtaining materials through interlibrary loans. The Statistics Canada library is happy to provide documents to other libraries through the interlibrary loan service.

Other Literature For Users of Data

The handbook you are reading is only one example of literature produced by Statistics Canada to assist users of statistics. The User Advisory Services Division is responsible for publishing user literature and other material designed to assist in the accessing and use of data. In addition to this handbook the division has produced a series of booklets aimed at promoting data in small- and medium-sized business. These are entitled:

How a Manufacturer Can Profit From Facts

How a Retailer Can Profit From Facts

How Contractors and Builders Can Profit From Facts.

In cooperation with the appropriate subject matter division in Statistics Canada, User Advisory Services has also published a booklet on the CPI entitled:

Your Guide to the Consumer Price Index

and has helped prepare slide/sound material on the Labour Force Survey, the Consumer Price Index and the Census. More user literature is planned and suggestions are welcomed for future material. Comments on this handbook or other existing literature and suggestions for future material should be directed to any of the regional reference centres.

APPENDIX I

Canadian Reference Libraries Receiving All Federal Government Publications, Including All Statistics Canada Publications

(There are also many other libraries holding extensive collections of Statistics Canada publications.)

Memorial University Library,
St. John's, Newfoundland.

Dalhousie University Library,
Studley Campus,
Halifax, Nova Scotia.

Acadia University Library,
Wolfville, Nova Scotia.

Harriet Irving Library,
University of New Brunswick,
Fredericton, New Brunswick.

Bibliothèque de l'université de Moncton
Moncton, Nouveau-Brunswick

Ralph Pickard Bell Library,
Mount Allison University,
Sackville, New Brunswick.

Planning Library,
P.O. Box 2000,
Charlottetown, Prince Edward Island.

Bibliothèque municipale
1210 Sherbrooke east
Montréal, Québec

McGill University Library,
3459 McTavish Street,
Montréal, Québec.

Concordia University Libraries,
Montréal, Québec.

Bibliothèques des sciences humaines et sociales
Université de Montréal
Montréal, Québec

Bibliothèque centrale
Ministère de l'Éducation du Québec
1685 est rue Fleury
Montréal, Québec

Bibliothèque de l'Université Laval
Cité Universitaire
Ste-Foy
Québec, Québec

Bibliothèque générale
Université de Sherbrooke
Cité Universitaire
Sherbrooke, Québec

York University Libraries,
4700 Keele Street,
Downsview, Ontario.

University of Guelph Library,
Documentation Centre,
Guelph, Ontario.

Hamilton Public Library,
Hamilton, Ontario.

Mills Memorial Library,
McMaster University,
Hamilton, Ontario.

Douglas Library,
Queen's University,
Kingston, Ontario.

University of Western Ontario Library,
London, Ontario.

National Library of Canada,
Canadiana Acquisitions Division,
Government Documents,
Ottawa, Ontario.

University of Ottawa Central Library,
165 Waller Street,
Ottawa, Ontario.

Laurentian University Library,
Sudbury, Ontario.

Metropolitan Toronto Library,
789 Yonge Street,
Toronto, Ontario.

University of Toronto Library,
Toronto, Ontario.

Lakehead University Library,
Thunder Bay, Ontario.

Public Library,
216 S. Brodie Street,
Thunder Bay, Ontario.

Dana Porter Arts Library,
University of Waterloo,
Waterloo, Ontario.

Windsor Public Library,
850 Ouellette Avenue,
Windsor, Ontario.

Elizabeth Dafoe Library,
University of Manitoba,
Winnipeg, Manitoba.

University of Saskatchewan Library,
Saskatoon, Saskatchewan.

University of Calgary Library,
Government Publications,
Calgary, Alberta.

University of Alberta Library,
Edmonton, Alberta.

Edmonton Public Library,
Sir Winston Churchill Square,
Edmonton, Alberta.

Simon Fraser University Library,
Burnaby, British Columbia.

University of British Columbia,
Library,
Government Publications,
Vancouver, British Columbia.

Vancouver Public Library,
750 Burrard Street,
Vancouver, British Columbia.

McPherson Library,
University of Victoria,
Victoria, British Columbia.

Northwest Territories Government
Library,
Government of Northwest Territories,
Yellowknife, Northwest Territories.

Note: Many legislative Libraries also receive all Statistics Canada publications. However, they may not be open to the general public.

APPENDIX II

User Advisory Regional Reference Centres Across Canada

St. John's

Statistics Canada,
2nd floor,
Viking Building,
Crosbie Road,
St. John's, Newfoundland,
A1B 3P2
Telephone: 726-0713

Halifax

Statistics Canada,
3rd Floor, 1256 Barrington Street,
Halifax, Nova Scotia.
B3J 1Y6
Telephone: 426-5331

Montréal

Statistics Canada,
7th Floor,
Alexis Nihon Plaza,
1500 Atwater Avenue,
Montréal, Quebec.
H3Z 1Y2
Telephone: 283-5725

Ottawa

Central Inquiries,
Statistics Canada,
Lobby, R.H. Coats Building,
Ottawa, Ontario.
K1A 0T6
Telephone: 992-4734; 996-5254

Toronto

Statistics Canada,
10th Floor,
25 St. Clair Avenue East,
Toronto, Ontario.
M4T 1M4
Telephone: 966-6586

Winnipeg

Statistics Canada,
Room 602,
General Post Office,
266 Graham Avenue,
Winnipeg, Manitoba.
R3C 0K4
Telephone: 949-4020

Regina

Statistics Canada,
530 Midtown Centre,
Regina, Saskatchewan.
S4P 2B6
Telephone: 359-5405

Edmonton

Statistics Canada,
10th Floor,
Baker Centre Building,
10025 – 106th Street,
Edmonton, Alberta.
T5J 1G9
Telephone: 420-3027

Vancouver

Statistics Canada,
Main Floor,
1145 Robson Street,
Vancouver, British Columbia.
V6E 1B8
Telephone: 666-3695

In the Maritimes, toll-free access to the Halifax office is available by calling 1-800-565-7192. Throughout Saskatchewan, the Regina office can be reached by dialing 1-800-667-3524 and in Alberta, the Edmonton office can be reached at 1-800-222-6400.

To subscribe to publications, please write to:

Publications Distribution,
User Advisory Services Division,
Statistics Canada,
Ottawa, Ontario.
K1A 0T6

REMEMBER

If you cannot find the figures you want, or you need help in using statistics, contact User Advisory Services at the nearest Statistics Canada office.

Statistics Canada publications are available to everyone. If they do not contain the information you want, it may be available in unpublished form.

For many statistics, special tabulations, more precisely tailored to your needs, can be provided at cost.

Always read the small print – the Introduction, Definitions and Notes. Make allowances for the fact that most statistics are approximations.

Government statistics are only one of a number of sources of information available to decision makers.

Don't be frightened of statistics but recognize your limitations and when you need to consult the experts.

Statistics Canada
Statistique Canada